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RELIABILITY & MAINTAINABILITY
HITLIST BAD ACTOR TOOL
(HITBAT)

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ABSTRACT

Warner Robins Air Logistics Center (WR-ALC) has the responsibility to manage the logistics of many major Air Force weapon systems currently in inventory. Not only does this require the traditional function of logistics management, but also the engineering effort required to maintain this inventory in a current, state-of-the-art, war-ready status. In order to identify items with less than desirable performance, a Materiel Management Operating Instruction (MMOI) was written to outline a process using product teams. The teams consist of the lead non-supervisory individuals from each functional area working together as a group to identify and plan corrective actions for reliability and maintainability (R&M) deficiencies in their assigned equipment. The Hitlist Bad Actor Tool (HITBAT) evolved to assist the product teams in this effort.

The primary requirement was to place all the information into a database to eliminate any redundant entries and provide for standardized input and output. The tool required the capability to display the information in logical form on a computer screen and be easily modified during the product team meetings. A system needed to be devised to allow all the teams in Directorate of Materiel Management (MM) to work concurrently and then output as a single database.

The solution to the problem, offered by HITBAT, is a personal computer (PC) database. It not only prints out four data pages of the R&M Action Plan and the R&M Hitlist, but displays to the screen interacting input forms which act like spreadsheets to compute and display information. The tool installs itself on a PC and brings up the first menu. There are four menus which guide the user through the process. The output can be either collected and stored on diskettes, left on the hard drive of the computer, or stored on a VAX supporting Kermit protocol. All of the operations mentioned are accomplished by menu selection. The databases stored on disks can be combined to make a larger database. This capability allows the individual product teams to work on and store their data before forwarding to a higher level. At the next update cycle, the product teams can load their data on HITBAT, make the necessary changes, and forward the information on diskettes. The designated point of contact in each division can select a menu option for the data to be uploaded to a file on the VAX. The data can be read but not changed by anyone on the system using the HITBAT software.

There are input forms for adding information into the database. They consist of a data sheet which contains such information as work unit codes (WUC), master stock number (MSN), mean time between failure (MTBF), goal mean time between failure (GMTBF), and many other data items. The second is a sheet which ranks the items according to the R&M 2000 Goals. This sheet can be displayed on the screen and dynamically changed. The changes will be immediately summed and the total weighting factor for the item displayed. This allows the product team to see the effect of making a change during their meeting. The third is a corrective action and interactive funding profile. It allows the required funding to be entered by fund type, year, and whether funded or unfunded. The total funded and unfunded amounts are continuously displayed by year and by fund.

In general, the tool has been designed to help the product team enter the necessary information and print out the required forms with the least effort possible

HARDWARE AND SOFTWARE REQUIREMENTS

HITBAT is hosted on a Z-248 or compatible computer and uses version 2.15 of Enable software residing in a directory called en215. The program is supplied on two floppy discs and is a totally menu driven system which installs itself on the hard drive. If it is to communicate with a VAX/VMS computer, it must be connected through the COM1 serial port and the VAX must support Kermit protocol. A specially configured account must also be established on the VAX.

INTRODUCTION

The HITBAT tool was developed to assist in the implementation of MMOI 800-19 dated 25 Aug 88. This instruction establishes responsibilities and procedures for maintaining an aggressive product Reliability and Maintainability (R&M) program and plan of action in the logistics management, repair, modification, and acquisition process. It assigns specific responsibilities for implementing the USAF R&M 2000, and other current Air Force policies which addresses product R&M improvement. The MMOI establishes product teams consisting of the logistics management specialist, the lead system engineer, the equipment specialist, the item management specialist(s), the production management specialist(s), and the maintenance line foreman/lead technician or unit chief. The team may also contain contracting and manufacturing point of contact (POC) and/or the local representative of the using command if applicable. The product team meets quarterly.

PRODUCT TEAM

Among the actions taken are:

(1) Review and evaluate the R&M problem items (submitted by any source) to select possible R&M bad actors. The team assigns action items to appropriate individuals to collect further information. At subsequent meetings they are ready to decide if they do indeed have an R&M bad actor and add it to their bad actor list.

(2) Review the ongoing corrective action plans for each item on the R&M bad actor list.

(3) Prioritize the R&M bad actor list.

(4) Submit the R&M bad actor list for section review.

MANAGEMENT REVIEWS

One of the actions taken at each level of review is to prepare a list of prioritized bad actors using a Weighting Factors Worksheet Report and submit it to the next management level. This process is repeated until the division level is reached. At the division level, the top 25 approved bad actors are incorporated into the Division R&M Action Plan/Commodity Master or into a Weapon System Master Plan (WSMP). The WSMP is then submitted to the Director of Materiel Management. The top 25 bad actors from each of the divisions are incorporated into a combined list for the Directorate of Materiel Management called the MM R&M HITLIST.

USING THE TOOL

Under this heading, reference will be made to numbered actions of the product team detailed above.

Action (1) The tool is first utilized to record a bad actor after it has been identified. Using the "ADD NEW RECORD" selection from the HITBAT menu, the team enters all the data currently available. They also indicate whether or not the item should be considered for technology insertion. If the indication is yes, the item will be included in reports generated by the technology insertion database which is also stored on the HITBAT database.

Action (2) The user edits the corrective action sheet by selecting "EDIT CORRECTIVE ACTION SHEET" from the HITBAT menu. Any changes to either the corrective plan or the funding profile can be made and displayed immediately for approval.

Action (3-4) The user can note the priority on the weighting action sheet as a separate item from the weighting factors. The weighting factors can also be filled out at this time. The tool can then either display to the screen or print out hard copy of the prioritized list. This list, when finalized, is ready to be presented for management review. Using the HITBAT main menu and entering "F", the tool will output to floppy disk drive A:. This will be a backup disk(s) of the information stored in the database. This information can then be stored as a backup or used to forward the information to the next reviewing level.

At this point, HITBAT has a variety of ways the user may store and utilize the information.

If the user wishes to keep one database stored on a VAX central computer, the user may download the database stored on the VAX by selecting "X" from the HITBAT menu. After the HITLIST menu comes up, the user selects "S" and waits for the tool to set the PC up as VT100 VAX terminal. The user signs on to his account and at the root directory prompt, executes a "ALT-F9" and then "R". The tool returns to the HITLIST menu where a selection can be made to download the information from the appropriate division. At this point, it should be noted that only one person can upload to the account since it is protected by an access control list (ACL). This precaution is necessary because anyone can download the information to their PC and only the last version uploaded will be saved for downloading. The preferred method is to keep the information on floppy disks until all the product teams have been included into a common database.

If the floppy disk method is used, the product teams would make backup copies as described above from the HITBAT main menu. Using this same menu, the person in charge of the records for the management review could enter "A" and receive prompts to add two databases together. The process can be continued until all the databases for the review are in one database backup disk(s). The information stored on the final backup disk(s) can be loaded by entering "L" from the HITBAT main menu. It then resides on the hard drive and operations can be performed on it by entering "G" from the HITBAT main menu.

At the management reviews, the weighting sheet can be selected from the HITBAT menu by selecting "EDIT WEIGHTING SHEET". The items can be sorted by priority and displayed/printed to indicate how the product teams have rated them. They can also be displayed/printed by weight which shows how they rate with respect to the R&M 2000 goals. The weights for each of the five goals can be altered on screen, automatically summed, and made a part of the database. If desired, the priorities can be reassigned to reflect how they rank by weighting factors by selecting "PRIORITIZE BY WEIGHT" from the HITBAT menu. When the information has been finalized and a backup made, the HITBAT main menu will allow the user to strip off the top 25 into a separate database. This can be reloaded into the tool and the top 25 printed out for the R&M Action Plan/Master Plan and uploaded to the VAX to be incorporated into the MM R&M HITLIST. The HITLIST can be downloaded by anyone into the tool. The database menu system (DBMS) of Enable can be entered by selecting "GO TO DBMS MENU" from the HITLIST menu. The database can then be searched for any special data you wish using the normal Enable commands. The tool can be re-entered by pressing "ALT-F10".

FUTURE PLANS

Since the start of the HITBAT program, the Robins Air Force Base Directorate of Materiel Management has installed an engineering central computing facility (ECCF). The facility places a large VAX system on the base local area network (Base LAN). Every engineer in MM now has access. With this system in place, it becomes possible to move HITBAT to a multi-user database program hosted on ECCF to overcome the problems discussed above in storing on the VAX. Still further down the road is a program being developed called a poor performance expert (APPEX). This is an artificial intelligence-based program. It will search the various R&M databases and draw conclusions as an expert would, only faster. The poor performance items will then be available to the product teams and management reviews by automatically being entered into HITBAT to edit and approve without the necessity of entering each item by hand.